

$$y = \frac{z}{2e^{2t} \cdot c_1 + 1}$$

варијабла  $u(x, y)$

$$x = e^t \cdot c_1^1$$

$$\rightarrow x(0) = 0$$

$$\rightarrow y(0) = u(0)$$

=

$$\frac{dx}{dt} = \frac{\frac{dx}{dz}}{\frac{dt}{dz}} = \frac{x'}{z'} =$$

$$x(z) = \dots \quad C = \dots \quad z, z \dots \quad \psi_1$$

деф. 2021. - 2

$$x_1' = 4x_1^2 x_2 - x_1 E(x_1, x_2) = F_1$$

$$E(x_1, x_2) = x_1^2 + 2x_2^2 - 4$$

$$x_2' = -2x_1^3 - x_2 E(x_1, x_2) = F_2$$

а)  $(0, 0)$  стабил.

б)  $(0, 0)$  стабил. Е као фја стабил?

$$а) 1) L = dF(0, 0) = \begin{bmatrix} 8x_1x_2 - E - x_1^2 z & 4x_1^2 - x_1 \cdot 4x_2 \\ -6x_1^3 - x_2 \cdot 2x_1 & -x_2 \cdot 4x_2 - E \end{bmatrix}_{(x_1, x_2) = (0, 0)} = \begin{bmatrix} 4 & 0 \\ 0 & 4 \end{bmatrix}$$

$\leadsto \lambda_1 = \lambda_2 = 4 \rightarrow$  нестабил.

$$2) V(x_1, x_2) = E(x_1, x_2) + 4 \dots$$

$$б) 4x_1^2 x_2 - x_1 E = 0 \quad \xrightarrow{x_1(4x_1x_2 - E)}$$

$$-2x_1^3 - x_2 E = 0$$

$$1^\circ x_1 = 0$$

$$-x_2 E = 0$$

$$\downarrow x_2 = 0$$

$$\downarrow x_2^2 = 2$$

$$x_2 = \pm \sqrt{2}$$

$$2^\circ 4x_1x_2 = E$$

$$\downarrow -2x_1^3 = x_2 E = 4x_1x_2^2$$

$$\downarrow x_1 = 0$$

⋮

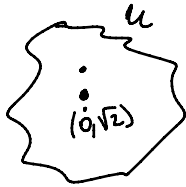
$$\downarrow \underbrace{-x_1^2}_{<0} = \underbrace{2x_2^2}_{>0} \Rightarrow x_1 = x_2 = 0$$

$$(0,0), (0, \pm\sqrt{2})$$

$$V = E?$$

$$1) (0,0) \quad V(0,0) = E(0,0) = -4 \neq 0$$

$$2) (0, \sqrt{2}) \quad V(0, \sqrt{2}) = 0 \quad \checkmark$$



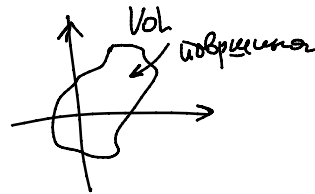
$$\exists u? \quad V|_{u=1 \times 1} > 0$$

$$V(0, \sqrt{2} + \epsilon) = 2(\sqrt{2} + \epsilon)^2 - 4 > 0$$

$$V(0, \sqrt{2} - \epsilon) = 2(\sqrt{2} - \epsilon)^2 - 4 < 0$$

} меня знак  
не меня

$$\underline{3} \quad F(x,y) = (x^2 - 2x + 2xy + 3y^3, 5y - 2x^2 - y^2 - 2xy) \rightarrow 2 \text{ грав.}$$



$$P(\phi_t(K))$$

$\square$  (о замкнутой)

$$K = I \times I$$

$$\frac{d \text{Vol}(\phi_t(K))}{dt} = \iint_{\phi_t(K)} \text{div} F \, dx \, dy$$

$$\frac{d P(\phi_t(K))}{dt} = \iint_{\phi_t(K)} 3 \, dx \, dy = 3 \cdot P(\phi_t(K))$$

$$\text{div} F = \frac{\partial F_1}{\partial x} + \frac{\partial F_2}{\partial y} = \dots = \overset{?}{(3)} \uparrow \text{const}$$

$$\Rightarrow P = e^{3t} \cdot P_0$$

$$P_0 = P(K) = 1$$